AMENDMENTS TO THE CLAIMS

Please amend Claims 19, 23, and 26 as indicated below:

1. (Original) A semiconductor circuit substrate for use in a radiation detection device, said radiation detection device comprising a detector substrate having a plurality of detector cells arranged to generate charge in response to incident radiation, each of said detector cells including at least one detector cell contact for coupling charge from said detector cell to said semiconductor circuit substrate, the semiconductor circuit substrate comprising:

a plurality of cell circuit contacts, each of which is configured to receive charge from a corresponding detector cell contact,

cell circuitry associated with said plurality of cell circuit contacts;

one or more conductive pathways arranged to carry at least one of control, readout and power supply signals to and/or from said cell circuitry; and

one or more signal pathways extending through said semiconductor circuit substrate, said one or more signal pathways being electrically coupled to said conductive pathways so as to provide an external signal interface for said cell circuitry.

2. (Original) A semiconductor circuit substrate according to claim 1, wherein said one or more signal pathways comprise a via hole containing conductive material.

3. (Original) A semiconductor circuit substrate according to claim 1, wherein the semiconductor circuit substrate comprises a first region and a second region, the first region having a first thickness and the second region having a second thickness, wherein the first thickness is greater than said second thickness and said signal pathways extend through said second region.

4. (Original) A semiconductor circuit substrate according to claim 3, wherein said second region is located adjacent an edge of said substrate.

5. (Original) A semiconductor circuit substrate according to claim 1, comprising conductive shielding around a substantial part of said one or more signal pathways.

6. (Original) A semiconductor circuit substrate according to claim 5, wherein said conductive shielding is coupled to a reference potential.

7. (Original) A semiconductor circuit substrate according to claim 5, including an insulating layer between the conductive shielding and said one or more signal pathways.

8. (Original) A semiconductor circuit substrate according to claim 1, wherein said semiconductor circuit substrate comprises a first surface and a second surface, said first surface being disposed opposite said second surface and being proximate to the detector substrate, wherein said cell circuit contacts are disposed on the first surface and said cell circuitry is formed in a region of said first surface.

9. (Original) A semiconductor circuit substrate according to claim 1, wherein said semiconductor circuit substrate comprises a first surface and a second surface, said first surface being disposed opposite said second surface and being proximate to the detector substrate, wherein said cell circuit contacts are disposed on the second surface and said cell circuitry is formed in a region of said second surface.

10. (Original) A semiconductor circuit substrate according to claim 1, wherein said cell circuitry comprises one or more of the following:

charge accumulation circuitry; counter circuitry; read out circuitry; energy discriminator circuitry; pulse shaping circuitry; pulse amplifying circuitry; analogue to digital converter circuitry; and rate divider circuitry.

11. (Original) A radiation detection device comprising a detector substrate and a semiconductor circuit substrate,

said detector substrate having a plurality of detector cells arranged to generate charge in response to incident radiation, each of said detector cells including at least one detector cell contact for coupling charge from said detector cell to the semiconductor circuit substrate, and

said semiconductor circuit substrate comprising:

a plurality of cell circuit contacts, each of which is configured to receive charge from a corresponding detector cell contact;

cell circuitry associated with said plurality of cell circuit contacts;

conductive pathways arranged to carry at least one of control, readout and power supply signals to and/or from said semiconductor circuit substrate; and

one or more signal pathways extending through said semiconductor circuit substrate, said one or more signal pathways being electrically coupled to said conductive pathways so as to provide an external signal interface for said cell circuitry.

12. (Original) A radiation detection device according to claim 11, wherein said detector cell contacts are disposed on a first surface of said detector substrate, said detector substrate having a bias contact on a surface opposing said first surface of the detector substrate, wherein said bias contact is arranged to co-operate with said detector cell contact so as to define a said detector cell.

13. (Original) A radiation detection device according to claim 12, wherein said bias contact is conductive.

14. (Original) A radiation detection device according to claim 11, wherein said detector substrate is mechanically coupled to said semiconductor circuit substrate by an array of said signal pathways.

15. (Original) A radiation detection device according to claim 11, including an adhesive layer arranged between the detector substrate and the semiconductor circuit substrate, said adhesive layer being arranged to mechanically couple said detector substrate to said semiconductor circuit substrate and having an adhesive material arranged so as to selectively

expose substantially all of each at least one detector cell contacts of said detector substrate so as to permit electrical contact between said at least one detector cell contacts and corresponding signal pathways.

16. (Original) A radiation detection device tile, comprising:

a radiation detection device according to claim 11; and

a mount for mounting said radiation detection device, wherein said mount includes contacts for conductively connecting said conductive pathways to corresponding external signal lines disposed on said mount.

17. (Original) A radiation imaging cassette, comprising:

a housing; and

a plurality of radiation detection device tiles according to claim 16, each radiation detection device tile being mounted in said housing and arranged so as to form an imaging tiled array.

18. (Original) A radiation imaging cassette according to claim 17, wherein said radiation detection device tiles are arranged to form a 3×3 array of radiation detection devices.

19. (Currently Amended) A method for fabricating a semiconductor circuit substrate for use in a radiation detection device, said semiconductor circuit substrate comprising cell circuitry, the method comprising the steps of:

(a) forming one or more via holes through [[a]]the semiconductor circuit substrate so as to form one or more signal pathways, ~~the or~~ each signal pathway having a first end and a second end;

(b) depositing conductive material in said one or more signal pathways to provide one or more conductive signal pathways therein;

(c) connecting at least one of control signal, readout and power supply lines to the first end of said signal pathways; and

(d) connecting cell circuitry to the second end of said signal pathways.

20. (Original) A method according to claim 19, including reducing the thickness of said semiconductor circuit substrate in a region of the substrate, and forming said via holes through the region.

21. (Original) A method according to claim 20, comprising fabricating said cell circuitry in said semiconductor circuit substrate prior to reducing the thickness of said semiconductor circuit substrate.

22. (Original) A method according to claim 19, comprising, prior to step (b):

depositing a conductive shielding over internal walls of said one or more via holes; and

depositing an insulating layer over said conductive shielding.

23. (Currently Amended) A method according to claim 19, wherein step (a) comprises:

depositing photo-resistive material over said semiconductor circuit substrate;

applying a photo-lithographic mask having one or more openings ~~corresponding in said region~~;

exposing said photo-resistive material through said openings in said mask;

removing said exposed photo-resistive material to expose said circuit substrate; and

etching said exposed semiconductor circuit substrate so as to form said one or more via holes.

24. (Original) A method according to claim 19, wherein step (b) comprises inserting conductive material into said one or more via holes.

25. (Original) A method of fabricating a radiation detector device, comprising:

fabricating a semiconductor circuit substrate according to claim 19;

forming a plurality of conductive contacts on a surface of said semiconductor circuit substrate, each conductive contact being arranged to receive charge from a detector cell formed in a detector substrate separate from said semiconductor circuit substrate;

connecting said plurality of conductive contacts with cell circuitry; and

connecting the detector substrate to said semiconductor circuit substrate by means of the conductive contacts.

26. (Currently Amended) A method for fabricating a semiconductor imaging device for imaging radiation, said semiconductor imaging device comprising a semiconductor circuit substrate comprising cell circuitry, the method comprising the steps of:

etching an array of via holes through [[a]]the semiconductor circuit substrate at locations associated with an array of detector cell circuit locations;

placing a detector substrate having an array of detector cell contacts corresponding to said array of cell circuit locations in proximal relationship to the etched semiconductor circuit substrate such that detector contacts are in correspondence with said via holes; and

depositing a conductive material in said via holes to provide signal pathways between said cell circuit locations and said detector cell contacts.

27. (Original) A method according to claim 26, comprising

selectively applying an adhesive material to one or both of said detector substrate and said semiconductor circuit substrate; and

coupling said detector substrate to said semiconductor circuit substrate by means of said adhesive material.

28. (Original) A method according to claim 27, in which the layer of adhesive material is selectively applied to as to leave said detector contacts substantially uncovered by said adhesive.

29. (Original) A method according to claim 28, wherein said adhesive material comprises photo-resistive material